Submission of Evidence to the Foreign Affairs Committee Inquiry on Tech and the future of UK Foreign Policy

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Introduction and summary

The authors are academic researchers in the field of technology and international relations. We have a long-standing interest in UK global biological security governance, biological security horizon scanning and foresight methods. We argue that there are cross-cutting lessons to be learnt from a wide range of stakeholders involved in assessing and responding to opportunities and challenges raised by technological innovation across a broad range of fields. To this end, we highlight the need to consolidate domestic expertise in order to be part of the global process through which global technology assessment norms are being shaped.

In this submission we:

1) **Introduce the contested concept of global technology assessment, as an increasingly important area of global policy relevant to UK interests.**

   We argue that it would serve the UK's current and longer-term foreign policy interests to more systematically monitor a) developments in science and technology b) evolving norms and practices in emerging technology governance

globally; and to c) formulate clearer guiding principles on the UK's foreign policy in this area.

2) Argue that there is a **need for a new focal point** for a **UK global technology assessment strategy**.

We highlight **the need for a co-ordinating institution** – which could play a pivotal role in linking up capacities domestically in the area of innovation strategy and governance, with the UK's foreign policy agenda. This body could **i) systematically track developments of relevance to UK foreign policy** ii**) support the development and evolution of a more explicit and consolidated policy on the issue of global technology assessment**.

This would be a good time to discuss such a proposal, considering the UK's emerging foreign policy priorities, as well as the recent establishment of the National Science and Technology Council and Office for Science and Technology Strategy. It would help build upon existing and emerging domestic capacities- and provide a new transmission-belt between domestic and international work in this area.

3) Suggest an **organizational blueprint** for such a body, in order to stimulate further discussion.

We show how such a body would potentially help build upon past and current UK successes in international institution building- by **increasing domestic capacity to lead on international initiatives and foster closer collaboration with industry other states in this area.** Such a body would put the UK in a better position to understand and respond to ongoing global transformations which are both mediated and driven by technological change.

4) **Outline the type of issues such a body could address** – highlighting how it can help feed into both domestic and foreign policy.

We further develop our case for such an institution through an examination of just one topic area which such a body could address – specifically the impact of developments in the biotechnology sector in the area of disarmament and non-proliferation.

Context: technology assessment as an emerging area of UK foreign policy

At both the national and the international level, there is a long history of attempts to monitor, assess and manage the broader economic, social and political impacts of technological change. The history of this area of policy can be traced back to the establishment of predictive capacities, in numerous states from the 1960's onwards- as part of the emergence of state level planning more generally. Initially, technology assessment focused primarily upon providing an early warning for government planners of potential hazards associated with emerging technologies, based on expert advice. Over time however, technology assessment has come to include a much broader range of aims, institutions and activities.

Today technology assessment takes a broader view on the types of opportunities and challenges technological change raises for society. **The function of TA bodies has also extended beyond a more traditional science advice model- coming to incorporate approaches centred on:**

i. **the provision of expert advice;**
ii. **the facilitation of public discussion, and;**
iii. **the integration of social and economic considerations to the stewardship and practice of innovation.**

Since the 1960's a range of national approaches to technology assessment have emerged- which informs how states engage with technology assessment at the domestic as well as the international level.

In recent years, there has **been a renewed interest in global technology assessment, as well as emerging global technology assessment norms at the international level.** Something which is reflected in both states attempts to facilitate global discussion and harmonization in relation to specific fields of technology, as well as attempt to establish cross-national technology assessment norms more broadly. At the international level, **the value of global technology assessment approaches has been of increasing interest to organisations such as the EU, OECD, as well as a number of UN organizations, scientific organisations, international treaty regimes, as well as broader international civil society.**

A number of example cross-cutting technology assessment initiatives are outlined in the box below.

The Global Technology Assessment Initiative	The Global Technology Assessment is a network of non-profit institutions from around the world working together in the area of science and technology, promoting responsible and sustainable research and innovation to tackle global grand challenges. Initiative membership includes a number of government technology review, advisory and assessment bodies from around the world.
The European Parliament Technology Assessment Network	The currently 23 members of EPTA give advice to their parliaments on topical issues such as nanotechnology, brain research, mobility pricing or future energy systems. Their projects use various methods and draw on insights from citizen panels, stakeholders, workshops as well as the foremost experts in the relevant fields.
UNIDIR Security and Technology Programme	Contemporary developments in science and technology present new opportunities as well as challenges to international security and disarmament. UNIDIR's Security and Technology Programme (SecTec) seeks to build knowledge and awareness on the international security implications and risks of specific technological innovations and convenes stakeholders to explore ideas and develop new thinking on ways to address them.
The International Academies Partnership	The InterAcademy Partnership (IAP) empowers academies and regional academy networks to provide independent, authoritative advice on global, regional, and national issues through synthesis reports, consensus statements, foresight studies, critiquing public policy processes and outputs, and convening key stakeholders.

Technology Facilitation Mechanism (TFM) Department of Economic and Social Affairs	The goal of the Technology Facilitation Mechanism is to support the implementation of the Sustainable Development Goals (SDGs). Its goal is to facilitate multi-stakeholder collaboration and partnerships through the sharing of information, experiences, best practices and policy advice among Member States, civil society, the private sector, the scientific community, United Nations entities and other stakeholders.

States with the largest economies globally, have either a long term, or emerging interest in technology assessment – and such policy is becoming increasingly outward looking. **In recent G20 meetings for example, the issue of global co-operation in innovation and innovation strategy have been an increasingly prominent feature.**

Broadening and deepening collaboration in this space, however, will not be without technical and political challenges. A recent cross-national review of technology assessment approaches points to a number of ways in which **states can be distinguished in ideological terms on the issue of technology assessment.**

To this end, the review points to a number of key considerations which will be important to efforts to foster global collaboration in this area. These include:

i. **the diverse political systems of prominent states (**e.g., authoritarian, liberal);
ii. **state preferences on the character of global institutions** (e.g., multi-level, top-down);
iii. **the socio-economic profile of states** (e.g., established economic power, rising economic power);
iv. **broader societal values and norms** (e.g., individualism, collectivism), and;
v. **broader societal engagement with policy making** (e.g., expert led, inclusive)[1]

[1] Hahn, Julia & Ladikas, M. & Kulakov, P. & Kazakova, A.A.. (2019). Constructing a global Technology Assessment: ways forward, parameters and limitations. Philosophy of Science and Technology. 24. 96-108. 10.21146/2413-9084-2019-24-2-96-108.

In this context then, the UK will need to work pro-actively to shape norms in this area.

The UK has traditionally played a prominent role in supporting global innovation and global institution building – and the UK's commitments to these areas of foreign policy have been reasserted as part of the recent Integrated Review[2].

As part of this work the government laid out a 'Strategic Framework to 2025' which gave a prominent role to both **global institutions building and fostering scientific and technological innovation**:

> *…we will take a more active approach to building and sustaining strategic advantage through S&T in support of our national goals. We will create the enabling environment for a thriving S&T ecosystem in the UK and extend our international collaboration, ensuring that the UK's successful research base translates into influence over the critical and emerging technologies that are central to geopolitical competition and our future prosperity.*
>
> *We will adopt an own-collaborate-access framework to guide government activity in priority areas of S&T, such as AI, quantum technologies and engineering biology.*

It is clear then, that that the UK will need to continue to develop its domestic capacity to monitor and assess technological change, as well as to understand and shape emerging technology governance at the global level.

To this end, we recommend that the UK should consolidate and integrate domestic expert capacity in order to:

i. **track and assess global developments in science and technology,**

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2 https://www.gov.uk/government/publications/global-britain-in-a-competitive-age-the-integrated-review-of-security-defence-development-and-foreign-policy

ii. **understand the emerging global technology assessment government ecosystem, and;**

iii. **support the development of principles and priorities in UK foreign policy in this area.**

Establishing a UK technology assessment coordinating body

The UK, as a first step, should seek to establish a co-ordinating body, initially tasked with:

1) **reviewing trends in science and technology and broader innovation governance practices globally of relevance to UK foreign policy priority areas, and;**
2) **formulating options for a UK Global Technology Assessment Strategy.**

The body should have a broad inclusive participation from across government, political parties, and wider civil society. It would work closely with but have a distinct brief to existing assessment and advisory bodies within government, including, but not limited to; the Parliamentary Office of Science and Technology, as well as existing horizon scanning and foresight capacities within the Government Office for Science and Defence Science and Technology Laboratory.

The organizational structure, and institutional affiliation of the co-ordinating body could take many forms, but in-order for our proposal to stimulate discussion, **we suggest it could be initially administered directly by the FCO and could have a four-part structure:**

Steering Committee: An FCO led leadership panel tasked with establishing standing and open-ended ad hoc working groups on key priority areas of technology and/or foreign policy objectives.

Administration and Reporting Body: Tasked with producing and disseminating report materials produced in collaboration with working groups, as well as the day-to-day administration of the functioning of the body.

UK Global Technology Assessment Strategy Working Group: This group will include senior representation for key stakeholders- as well as expert groups

members. Initially it should be tasked with the development of policy options. Later tasks might include strategy implementation monitoring and review.

Emerging Technology and Foreign Policy Working Groups: These working groups are designed and populated by the steering committee. It is likely that there would need to be standing committees, arranged around important foreign policy agenda areas- or else specific areas emerging technology. The working groups would consist of relevant technical experts and stakeholder representatives- nominated by the steering comittee.

These groups would develop periodic reports, which would be collated and published by the reporting body. Such groups could report on:

i. relevant R&D, technological and emerging market trends;
ii. potential impacts of emerging technologies on UK foreign policy, and;
iii. initiatives, good practice, and challenges of relevance to the global governance of emerging technologies.

Several organizational and political questions are raised by such a proposal. This includes, for example, questions of resources, representation, the specifics of the working-group briefs, and the assumed long-term necessity of an organization such as this.

Demonstrating the potential scope and added value of an emerging technology and foreign policy co-ordinating body.

In the remainder of this submission, we highlight on the type of information that an Emerging Technology and Foreign Policy Working Group could collate - as well as the type of questions and recommendations the working groups might point to for consideration as part of broader UK technology assessment strategy. **We do this with reference to just one narrow area of concern- specifically the impact of emerging technology on the risk of biological weapon proliferation.**

Background

The UK has played a leading role historically in the prohibition and non-proliferation regime directed at biological weapons. This includes a prominent role in the negotiation and continued evolution of the Biological and Toxin Weapon Convention treaty regime - reflected most recently for example in UK participation in preparations for the Ninth Review Conference. This is in addition to the areas of export control harmonisation, global public health, global laboratory safety and security as well as the UK's long-term support for disarmament education for practicing life-sciences.

In this area, **the UK has an opportunity to both build upon this legacy of international leadership and to capitalise on the unique circumstances presented by the convergence of a post-Brexit and post-COVID19 world** in the coming years**.**

Developments in science and technology

(Biological) technology capabilities are expanding rapidly and international regimes governing biological research date back several decades. **The convergent and frenetic nature of biotechnology advances raise significant proliferation concerns - and present incremental as well as more fundamental challenges to the existing global biological weapon control regime**.[3]

Currently, discussion and assessment of biological weapon proliferation risks take place in a wide range of contexts.[4] There is then always a substantial stream of both primary data on scientific trends, as well as expert discussion of the potential proliferation potentials of technology to keep track on in the open literature.

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[3] Wintle, Bonnie C et al., 2017. A transatlantic perspective on 20 emerging issues in biological engineering. *eLife*, 6, eLife, 2017–11-14, Vol.6. https://pubmed.ncbi.nlm.nih.gov/29132504/ Luke et al., 2020. Bioengineering horizon scan 2020. eLife, 9, pp.eLife, 2020–05-29, Vol.9. https://elifesciences.org/articles/54489

[4] J. Revill, A. Anand and G. Persi Paoli. (2021) Exploring Science and Technology Review Mechanisms Under the Biological Weapons Convention, Geneva, Switzerland: UNIDIR, https://doi.org/10.37559/SECTEC/2021/SandTreviews/01

The timely analysis of such work can provide an evidence base about the impacts of such advances in the area of non-proliferation and help support the UK in anticipating and shaping discussions of such developments at the global level.

Evolving norms and practices in emerging technology governance globally

International regimes that work to prevent the development and proliferation of biological weapons are multi-faceted and multi-layered. Scientific and technological change has profound impacts upon these regimes.

This is reflected in the attempts by numerous states and civil-society groups to engage technology assessment exercises in this area. It is also reflected in attempts to strengthen the S&T review mechanism of the BTWC. **In order to lead policy in this area there is a need for the UK to support and track work that seeks to better understand the challenges involved in foresight of emerging biotechnologies**[5] [6].

This then will allow the UK to develop and advocate good practice in the area. This includes advancing the evidence and methods developed and utilized by UK science advice and technology assessment institutions. It will also allow the UK to show-case and adopt methods developed within academia, civil society, and the private sector.

[5] Beard, S., Rowe, T., & Fox, J. (2020). An analysis and evaluation of methods currently used to quantify the likelihood of existential hazards. Futures, 115, 102469. https://www.cser.ac.uk/resources/analysis-evaluation-methods/

[6] Currie, A. (2019). Existential risk, creativity & well-adapted science. Studies in History and Philosophy of Science Part A, 76, 39-48. https://www.cser.ac.uk/resources/xrisk-creativity/

Methods for emerging technology assessment, foresight, and accountability

Recent work by the Centre for the Study of Existential Risk, has examined and applied a range of methods as they relate to extreme risks[7] and human survival[8], innovation assessment[9] and governance[10].

1) **In order to understand how biological research and innovation may interact with or impact extreme risks or critical ecosystems**, researchers have applied a range of *horizon scanning methods* based on the *investigate, discuss, estimate, aggregate* (IDEA) protocol.[11] [12] [13]
2) **To help direct research activities towards the most pressing topics**, they have utilized a *modified expert elicitation* to identify specific questions that are of sufficient breadth and importance gain an understanding of research

[7] Centre for the Study of Existential Risk. (2019). Managing global catastrophic risks Part 1: Understand. https://www.cser.ac.uk/resources/policy-series-managing-global-catastrophic-risks-part-1-understand/

[8] Beard, S., Rowe, T., & Fox, J. (2020). An analysis and evaluation of methods currently used to quantify the likelihood of existential hazards. Futures, 115, 102469. https://www.cser.ac.uk/resources/analysis-evaluation-methods/

[9] Rhodes, C. (2020). Scientific freedom and responsibility in a biosecurity context. In The freedom of scientific research. Manchester University Press. https://www.cser.ac.uk/resources/scientific-freedom-and-responsibility-biosecurity-context/

[10] Kemp, L., & Rhodes, C. (2020). The Cartography of Global Catastrophic Governance. https://www.cser.ac.uk/resources/cartography-global-catastrophic-governance/

[11] Hanea, A. M., McBride, M. F., Burgman, M. A., Wintle, B. C., Fidler, F., Flander, L., ... & Mascaro, S. (2017). Investigate Discuss Estimate Aggregate for structured expert judgement. International Journal of Forecasting, 33(1), 267-279. https://www.cser.ac.uk/resources/investigate-discuss-estimate-aggregate-structured-expert-judgement/

[12] Hemming, V., Burgman, M. A., Hanea, A. M., McBride, M. F., & Wintle, B. C. (2018). A practical guide to structured expert elicitation using the IDEA protocol. Methods in Ecology and Evolution, 9(1), 169-180. https://www.cser.ac.uk/resources/practical-guide-structured-expert-elicitation-using-idea-protocol/

[13] Jucker, T., Wintle, B., Shackelford, G., Bocquillon, P., Geffert, J. L., Kasoar, T., ... & Mukherjee, N. (2018). Ten-year assessment of the 100 priority questions for global biodiversity conservation. Conservation Biology, 32(6), 1457-1463. https://www.cser.ac.uk/resources/tenyear-assessment-questions-conservation/

agendas within the life sciences globally, and that are of significance for the UK.[14]

3) **In the exploration of near-term developments in technology** they have advocated the use of regular *expert elicitation exercises* which emphasise a diversity of experts, and which may incorporate a "red team" approach to increase the range and creativity of scenarios considered.[15] [16] [17]
4) **To assist in the exploration of longer-term (biological) technological developments** we recommend the use of *theoretical analysis and survey work* to identify key themes and milestones that can structure future foresight exercises. [18] [19]

Alongside a robust foresight capability, there is also a need to review developments, good practice and expert recommendations related to governance of biotechnology research, to mitigate potential concerns.

To this end, Centre for the Study of Existential Risk has also explored the prevalence, utility and practical challenges associated with:

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[14]Kemp, L., Aldridge, D. C., Booy, O., Bower, H., Browne, D., Burgmann, M., ... & Sutherland, W. J. (2021). 80 questions for UK biological security. Plos one, 16(1), e0241190. https://www.cser.ac.uk/resources/80-questions-uk-biological-security/

[15] Wintle, B. C., Boehm, C. R., Rhodes, C., Molloy, J. C., Millett, P., Adam, L., ... & Sutherland, W. J. (2017). Point of View: A transatlantic perspective on 20 emerging issues in biological engineering. Elife, 6, e30247. https://www.cser.ac.uk/resources/point-view-transatlantic-perspective-20-emerging-issues-biological-engineering/

[16] Brundage, M., Avin, S., Clark, J., Toner, H., Eckersley, P., Garfinkel, B., ... & Amodei, D. (2018). The malicious use of artificial intelligence: Forecasting, prevention, and mitigation. arXiv preprint arXiv:1802.07228. https://www.cser.ac.uk/resources/malicious-use-artificial-intelligence/

[17] Kemp, L., Adam, L., Boehm, C. R., Breitling, R., Casagrande, R., Dando, M., ... & Sutherland, W. J. (2020). Point of View: Bioengineering horizon scan 2020. Elife, 9, e54489. https://www.cser.ac.uk/resources/bioengineering-horizon-scan-2020/

[18] Martınez-Plumed, F., Loe, B. S., Flach, P., O hEigeartaigh, S., Vold, K., & Hernández-Orallo, J. (2018). The facets of artificial intelligence: a framework to track the evolution of AI. In International Joint Conferences on Artificial Intelligence (pp. 5180-5187). https://www.cser.ac.uk/resources/facets-AI/

[19] Cremer, C. Z., & Whittlestone, J. (2020). Canaries in Technology Mines: Warning Signs of Transformative Progress in AI. https://www.cser.ac.uk/resources/canaries-technology-mines/

1) **Integration of *risk assessment* into the *earliest stages* of developing and procuring novel technologies**, especially for safety-critical or defence-related systems. [20]
2) **Ensuring *throughout-lifetime accountability* for high-technology systems**, particularly those used by the military. [21] [22]
3) **Informing and instilling a culture of systemic risk awareness amongst 'universal owners'**, the class of institutional investors that by their nature cannot stock-pick their way out of a crisis, thus aligning significant financial interest and resources with broad risk management priorities. [23]
4) **Investing in regulation, auditing, and support for academic research to build an ecosystem** that is able to hold developers of emerging technologies accountable, thus creating an environment where user trust can be placed in trustworthy actors. [24]
5) **Experimental frameworks for collaborative governance of biological research** that address rapid changes in technical, social, and political environments, coupled with the emergence of natural diseases such as COVID-19, that are testing existing governance processes.[25]

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[20] Jayanti, A., & Avin, S. (2020). It Takes a Village: The Shared Responsibility of 'Raising' an Autonomous Weapon. Submitted to and Presented at RSIS Military Transformations Programme Workshop. https://www.cser.ac.uk/resources/it-takes-village/

[21] Shackelford, G. E., Kemp, L., Rhodes, C., Sundaram, L., ÓhÉigeartaigh, S. S., Beard, S., ... & Sutherland, W. J. (2020). Accumulating evidence using crowdsourcing and machine learning: A living bibliography about existential risk and global catastrophic risk. Futures, 116, 102508. https://www.cser.ac.uk/resources/accumulating-evidence-using-crowdsourcing-and-machine-learning-living-bibliography-about-existential-risk-and-global-catastrophic-risk/

[22] Centre for the Study of Existential Risk. (2019). Managing global catastrophic risks Part 1: Understand. https://www.cser.ac.uk/resources/policy-series-managing-global-catastrophic-risks-part-1-understand/

[23] Quigley, E. (2020). Universal Ownership in Practice: A Practical Positive Investment Framework for Asset Owners. Available at SSRN 3638217. https://www.cser.ac.uk/resources/universal-ownership-practice/

[24] Brundage, M., Avin, S., Wang, J., Belfield, H., Krueger, G., Hadfield, G., ... & Anderljung, M. (2020). Toward trustworthy AI development: mechanisms for supporting verifiable claims. arXiv preprint arXiv:2004.07213. https://www.cser.ac.uk/resources/toward-trustworthy-ai/

[25] Sam Weiss Evans, Jacob Beal, Kavita Berger, Diederik A. Bleijs, Alessia Cagnetti, Francesca Ceroni, Gerald L. Epstein, Natàlia Garcia-Reyero, David R. Gillum, Graeme Harkess, Nathan J. Hillson, Petra

Formulating clearer guiding principles on the UK's Foreign Policy in this area

In addition to tracking the above developments in technology and policy, there is also a need to refine UK foreign policy in this area, as it relates to UK biosecurity strategy.

In 2018, the UK government produced the 'UK Biological Security Strategy' which was intended to bring together and set out in one place for the first time, the wide range of activity that is carried out across Government to do this. The strategy focused on the goals of Understanding, Preventing, Detecting and Responding to the wide range of biological hazards the UK faces. The document also set out a series of commitments related to its domestic and international facing policy.

Since this time, the emergence of COVID-19, and the broader impacts of the pandemic on a wide range of policy areas, has had a profound effect on this area of policy. In December 2020, Joint Committee on the National Security Strategy Biosecurity and National Security Enquiry made a series of recommendations- to which the UK government responded to these recommendations in March 2021.[26] It is clear that there will be significant developments in this area of UK policy in coming years. Further to this, a recent academic study, has pointed to an even broader range of issues facing policy makers in this area.[27]

The UK will continue to innovate both its domestic and international policy in this area in response to longer-standing interests, as well as those raised by the global pandemic. Such work will likely benefit for additional means of co-operation and communication. In addition, the emphasis placed on both innovation and the shaping of global norms seems to suggest that **the UK will be expected to play an**

A. M. Hogervorst, Jacob L. Jordan, Geneviève Lacroix, Rebecca Moritz, Seán Ó hÉigeartaigh, Megan J. Palmer, Mark W. J. van Passel (2020) Embrace experimentation in biosecurity governance https://www.cser.ac.uk/resources/embrace-experimentation-biosecurity/

[26] https://committees.parliament.uk/work/316/biosecurity-and-national-security/publications/

[27] Kemp, L., Aldridge, D. C., Booy, O., Bower, H., Browne, D., Burgmann, M., ... & Sutherland, W. J. (2021). 80 questions for UK biological security. Plos one, 16(1), e0241190. https://www.cser.ac.uk/resources/80-questions-uk-biological-security/

even more prominent role in the assessment of technological innovation as well as the norms that shape it globally.

This points to the value of supporting the ongoing development and review of policies specific to this issue area- but also to develop cross-cutting insights, practices and policies in the wide range of areas in which technology assessment and global technology assessment norms are becoming increasingly pertinent.